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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/509,101	KALLBERG, SYLVID	
	Examiner	Art Unit	
	NICOLAS A. ARNETT	4124	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *18 July 2005*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-57* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-10,13,14,16-29,31-35,37-46,48-53 and 57* is/are rejected.

7)☒ Claim(s) *11,12,15,30,36,47 and 54-56* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *27 September 2004* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *9/27/2004*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Specification

1. The title of the invention is not descriptive. A new title is required that is clearly indicative of the invention to which the claims are directed.

The following title is suggested: Optical liquid level sensor controlled method and system for refueling.

Claim Objections

2. Claims 1, 8, 19 and 38 are objected to because of the following informalities:

a. in claim 1, "the fuel receiving object" lacks antecedent basis in the claims;

b. in claim 8, "arcshaped" should read --arc-shaped--;

c. in claim 19, “the fuel receiving object” lacks antecedent basis in the claims;

d. in claim 38, “the reflection means” lacks antecedent basis in the claims.

Appropriate correction is required.

Claim Rejections - 35 USC § 112

3. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

4. Claims 6-8, 24-26, 28, 31, 32, 42, 49, 53 and 57 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

a. Regarding claim 6, the word "preferably" renders the claim indefinite because it is unclear whether the limitation “in the form of visible light” following the word is part of the claimed invention. See MPEP § 2173.05(d).

b. Regarding claim 7, the word "preferred" renders the claim indefinite because it is unclear whether the limitation “distance between said means being about 6 mm:s” following the word is part of the claimed invention. See MPEP § 2173.05(d).

c. Regarding claim 8, the word "preferably" renders the claim indefinite because it is unclear whether the limitation “having an arc-shaped configuration” following the word is part of the claimed invention. See MPEP § 2173.05(d).

d. Regarding claim 24, the word "preferably" renders the claim indefinite because it is unclear whether the limitation “in the form of visible light” following the word is part of the claimed invention. See MPEP § 2173.05(d).

e. Regarding claim 25, the word "preferred" renders the claim indefinite because it is unclear whether the limitation “distance between said means being about 6 mm:s” following the word is part of the claimed invention. See MPEP § 2173.05(d).

f. Regarding claim 26, the word "preferably" renders the claim indefinite because it is unclear whether the limitation “having an arc-shaped configuration” following the word is part of the claimed invention. See MPEP § 2173.05(d).

g. Regarding claim 28, the word "preferably" renders the claim indefinite because it is unclear whether the limitation “arc-shaped” following the word is part of the claimed invention. See MPEP § 2173.05(d).

h. Regarding claim 31, the phrase "to a certain extent" renders the claim indefinite because it is unclear to what extent the configuration of the lenses is “off-spherical.”

i. Regarding claim 32, the word "preferably" renders the claim indefinite because it is unclear whether the limitation “being arc-shaped” following the word is part of the claimed invention. See MPEP § 2173.05(d).

j. Regarding claim 42, the word "preferably" renders the claim indefinite because it is unclear whether the limitation “visible light” following the word is part of the claimed invention. See MPEP § 2173.05(d).

k. Regarding claim 49, the word "preferably" renders the claim indefinite because it is unclear whether the limitation “visible light” following the word is part of the claimed invention. See MPEP § 2173.05(d).

l. Regarding claim 53, the word "preferably" renders the claim indefinite because it is unclear whether the limitation “arc-shaped” following the word is part of the claimed invention. See MPEP § 2173.05(d).

m. Regarding claim 57, the word "etc." renders the claim(s) indefinite because the claim(s) include(s) elements not actually disclosed (those encompassed by "etc."), thereby rendering the scope of the claim(s) unascertainable. See MPEP § 2173.05(d).

The following prior art rejections are based on the claims as best understood by the examiner in view of the above rejections.

5. Regarding statements of intended use, it has been held that a recitation with respect to the manner in which a claimed apparatus is intended to be employed does not differentiate the claimed apparatus from a prior art apparatus satisfying the claimed structural limitations. *Ex parte Masham*, 2 USPQ2d 1647 (1987). Regarding "whereby" statements, it has been held that the functional "whereby" statement does not define any structure and accordingly can not serve to distinguish. *In re Mason*, 114 USPQ 127, 44 CCPA 937 (1957). Throughout the following prior art rejections, statements of intended use and "whereby" statements are *italicized.*

Claim Rejections - 35 USC § 102

6. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

7. Claims 1-3, 13, 19-21 and 33 are rejected under 35 U.S.C. 102(b) as being anticipated by US Patent 4,033,389 to Hansel et al. (Hansel).

Hansel teaches:

<u>In Reference to Claim 1</u>

A method for spill free refueling (Abstract) comprising: establishing a liquid tight connection (col. 2, lines 49-58; the vapor receiving system on the fuel nozzle is sealed to the fill pipe opening) between a refueling gun nozzle (see Fig. 1) for fuel dispensing and a coupling piece (end of the fill pipe) of the fuel receiving object, *through which fuel is provided to a fuel container* (abstract), detecting a predetermined fuel level (col. 3, lines 38-50; the predetermined fuel level is the end of the spout once inserted into the fill pipe) and automatically interrupting the fuel flow when said level is detected (col. 3, lines 38-50), characterized in that a level detection signaling configuration is established by moving the gun into position for establishment of the liquid-tight connection (col. 3, lines 38-50 and col. 5, lines 57-65; the signaling configuration is the pressure detected by the diaphragm system when the fuel reaches the end of the spout and that configuration is only established when the spout is inserted fully, causing a liquid tight connection).

In Reference to Claim 2

The method according to claim 1 (see rejection of claim 1 above), characterized in that signals for detecting said predetermined level are transferred to the fuel container from means carried and supported by the gun (col. 3, lines 38-50; the placement of the spout in the fuel container transfers a signal to the fuel container from the gun, the signal being the position of the end of the spout indicating the predetermined fuel level).

In Reference to Claim 3

The method according to claim 1 (see rejection of claim 1 above), characterized in that a signal corresponding to detection of said predetermined level is transferred to receiving means, carried and supported by the gun for further processing (col. 3, lines 38-50; the pressure caused by the fuel filling the container is the signal corresponding to the detection of the predetermined level and is transferred to the diaphragm system carried by the gun).

In Reference to Claim 13

The method according to claim 1 (see rejection of claim 1 above), characterized in, that complete and secure connection (col. 5, lines 33-38) between the nozzle and the coupling piece is detected by means of the level detection signalling configuration, which is not fully established until said connection is completed (col. 3, lines 38-50 and col. 5, lines 57-65; the signaling configuration is the pressure detected by the diaphragm system when the fuel reaches the end of the spout and that configuration is only established when the spout is inserted fully, causing a liquid tight connection).

In Reference to Claim 19

The system for spill free refueling (abstract) comprising means for establishing a liquid tight connection (vapor receiving system 25) between a refueling gun nozzle (see Fig. 1) for fuel dispensing and a coupling piece of the fuel receiving object (receiving end of the fill pipe), *through which fuel is intended to be provided to a fuel container of said object* (col. 1, lines 15-19) and further comprising means for detecting a

predetermined fuel level (pressure responsive diaphragm system) and for automatically interrupting the fuel flow when said level (end of the spout) is detected (col. 3, lines 38-50), characterized in that a level detection signaling configuration is arranged to be established by means of moving said gun into position for establishment of the liquid tight connection (col. 3, lines 38-50 and col. 5, lines 57-65; the signally configuration is the pressure detected by the diaphragm system when the fuel reaches the end of the spout and that configuration is only established when the spout is inserted fully, causing a liquid tight connection).

In Reference to Claim 20

The system according to claim 19 (see rejection of claim 19 above), characterized in that means carried and supported by the gun are provided *for transferring signals for detecting said predetermined level to the fuel container* (col. 3, lines 38-50; the end of the spout placed in the fuel container transfers a signal to the fuel container from the gun, the signal being the position of the end of the spout indicating the predetermined fuel level).

In Reference to Claim 21

The system according to claim 19 (see rejection of claim 19 above), characterized in that receiving means (pressure responsive diaphragm system) carried and supported by the gun (col. 5, lines 38-50) are provided for receiving a signal (pressure of the fuel) corresponding to detection of said predetermined level for further

processing ((col. 3, lines 38-50; the pressure caused by the fuel filling the container is the signal corresponding to the detection of the predetermined level and is transferred to the diaphragm system).

In Reference to Claim 33

The system according to claim 19 (see rejection of claim 19 above), characterized by means for detecting complete and secure connection (the interlock valve comprises means for detecting the secure connection) between the nozzle and the coupling piece by means of the level detection signalling configuration, said configuration being fully established when said connection is completed (col. 3, lines 38-50 and col. 5, lines 57-65; the signally configuration is the pressure detected by the diaphragm system when the fuel reaches the end of the spout and that configuration is only established when the spout is inserted fully, causing a liquid tight connection).

8. Claims 41-44, and 48-51 are rejected under 35 U.S.C. 102(b) as being anticipated by US Patent 5,880,480 to Ellinger et al. (Ellinger).

Ellinger teaches:

In Reference to Claim 41

A method for detecting a predetermined liquid fuel level (abstract) comprising detecting the liquid level in a container for the liquid and producing an indication signal when said level is reached (abstract), characterized by the steps of

• arranging a transparent prism arrangement in the liquid container (sensor assembly 12 includes prism 28 attached to the housing of a liquid tank; col. 4, lines 28-40);

• providing an optical detection signal falling in against said prism arrangement (LED 24 emits a beam of light to a surface of the prism; col. 4, lines 61-64);

• reflecting said signal by the prism arrangement and detecting the reflected signal (when the prism is exposed to air the light is reflected back to a phototransistor 26 which detects the signal; col. 5, lines 21-28);

• contacting the prism arrangement with the liquid when the predetermined level is reached (occurs when the fuel level reaches the prism; col. 4, lines 58-61), *whereby the refractory configuration is changed so that the signal to a considerable extent is transmitted into the liquid instead of being reflected* (col. 4, line 64 - col. 5, line 6);

• detecting the decrease in reflected light (col. 5, lines 4-6).

In Reference to Claim 41

The method according to claim 41 (see rejection of claim 41 above), characterized in that said signals are beams of light (32), preferably visible light (LED 24 emits both visible and infrared light; col. 4, lines 61-64).

In Reference to Claim 42

The method according to claim 41 (see rejection of claim 41 above), characterized by arranging the prism arrangement so that a certain deviation takes

place when the signal is reflected (Fig. 2B shows the deviation when the signal is reflected).

In Reference to Claim 44

The method according to claims 41 (see rejection of claim 41 above), characterized by arranging the prism arrangement together with a lens arrangement in an extended arrangement (collimating lenses; col.4, lines 43-44) *to provide reflection and deviation for different positions of the detection signal relative to the prism and lens arrangement.*

In Reference to Claim 48

A device for detecting a predetermined liquid fuel level, comprising means for detecting the liquid level and for producing an indication when said level is reached (abstract), characterized by

- reflection means comprising a transparent prism arrangement (prism 28) *and intended to be disposed in the container* (col. 4, lines 36-40);
- means for providing (LED 24) an optical detection signal (infrared and visible light 32) *intended to enter said prism arrangement*;
- means for receiving and detecting (phototransistor 26) reflected detection signals; and
- in that the reflection means are arranged so that detection signals are reflected when the liquid has not reached the reflection means (col. 5, lines 21-29), and are transmitted

into the liquid when the liquid has reached the reflection means due to the change in refractory configuration (col. 4, line 56 - col. 5, line 6).

In Reference to Claim 49

The device according to claim 48 (see rejection of claim 48 above), characterized in that said signals are beams of, preferably visible, light (col. 4, lines 61-64).

In Reference to Claim 50

The device according to claim 48 (see rejection of claim 48 above), characterized in that said prism arrangement is arranged so that a certain deviation is obtained between entering signal and reflected signal (Fig. 2B shows the deviation by the signal as it is reflected).

In Reference to Claim 51

The device according to claims 48, characterized by a prism arrangement with complementary optics, comprising a lens arrangement arranged in an extended arrangement (collimating lenses between the photo devices 24, 26 and the prism 28) *to provide reflection and deviation for different positions of the detection signal relative to the prism and lens arrangement*.

Claim Rejections - 35 USC § 103

9. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

10. Claims 16 and 37 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hansel in view of US Patent 5,431,199 to Benjay et al. (Benjay).

In Reference to Claim 16

Hansel teaches the method according to claim 1 (see rejection of claim 1 above). Hansel further teaches that the fuel connection between the nozzle and the coupling piece is opened in successive steps during the coupling procedure, the coupling piece opens the nozzle (when the secure connection is made the coupling piece interacts with the actuation system of the interlock valve to open the nozzle; col. 6, lines 6-13), and vice versa when closing, so that the nozzle is closed first (when the nozzle is removed from the fill pipe, the removal of pressure on the actuation system allows the interlock valve to close, closing the nozzle).

Hansel does not specify that the coupling piece comprises a valve so that the nozzle opens the coupling piece and when closing, the coupling piece is closed.

Benjay teaches a fuel tank filler pipe comprising a seal door assembly (22) so that the nozzle opens the coupling piece (see Fig. 5) and when closing, the coupling piece is closed (see Fig. 2 showing the coupling piece closed when the nozzle is

removed) to prevent venting of fuel vapor to the atmosphere when the fuel cap is removed (col. 1, lines 22-25).

It would have been obvious to one having ordinary skill in the art at the time of invention to have included the seal door assembly of Benjay in the fill pipe of Hansel such that that the nozzle opens the coupling piece and when closing, the coupling piece is closed to prevent venting of fuel vapor to the atmosphere when the fuel cap is removed as taught explicitly by Benjay.

In Reference to Claim 37

Hansel teaches the system according to claim 19 (see rejection of claim 19 above). Hansel further teaches that the fuel connection between the nozzle and the coupling piece is arranged so that it is opened in successive steps during the coupling procedure, the coupling piece being arranged to open the nozzle thereafter (when the secure connection is made the coupling piece interacts with the actuation system of the interlock valve to open the nozzle; col. 6, lines 6-13) and vice versa when closing, the nozzle being closed before the coupling piece being closed.

Hansel does not teach the nozzle being arranged to open the coupling piece and when closing, the coupling piece being closed after the nozzle.

Benjay teaches a fuel tank filler pipe comprising a seal door assembly (22) so that the nozzle opens the coupling piece (see Fig. 5) and when closing, the coupling piece is closed (see Fig. 2 showing the coupling piece closed when the nozzle is

removed) to prevent venting of fuel vapor to the atmosphere when the fuel cap is removed (col. 1, lines 22-25).

It would have been obvious to one having ordinary skill in the art at the time of invention to have included the seal door assembly of Benjay in the fill pipe of Hansel such that that the nozzle opens the coupling piece and when closing, the coupling piece is closed to prevent venting of fuel vapor to the atmosphere when the fuel cap is removed as taught explicitly by Benjay.

11. Claims 1, 2, 4, 14, 19, 20, 22, 23, 34, 35 and 38 are rejected under 35 U.S.C. 103(a) as being unpatentable over US Patent 3,662,924 to Crandall et al. (Crandall) in view of Hansel.

In Reference to Claim 1

Crandall teaches a method for spill free refuelling (abstract) comprising detecting a predetermined fuel level (location of prism 73) and automatically interrupting the fuel flow when said level is detected (col. 5, lines 70 - col. 6, line 9).

Crandall does not teach the method including the steps of establishing a liquid tight connection between a refuelling gun nozzle for fuel dispensing and a coupling piece of the fuel receiving object, *through which fuel is provided to a fuel container*, characterized in that a level detection signalling configuration is established by moving the gun into position for establishment of the liquid-tight connection.

Hansel teaches a method for spill free refueling including the steps of establishing a liquid tight connection (col. 2, lines 49-58; the vapor receiving system on

the fuel nozzle is sealed to the fill pipe opening) between a refueling gun nozzle (see Fig. 1) for fuel dispensing and a coupling piece (end of the fill pipe) of the fuel receiving object, *through which fuel is provided to a fuel container* (abstract), characterized in that a level detection signaling configuration is established by moving the gun into position for establishment of the liquid-tight connection (col. 3, lines 38-50 and col. 5, lines 57-65; the signally configuration is the pressure detected by the diaphragm system when the fuel reaches the end of the spout and that configuration is only established when the spout is inserted fully, causing a liquid tight connection) to prevent the escape of gasoline vapors into the atmosphere (col. 1, lines 20-32).

It would have been obvious to one having ordinary skill in the art at the time of invention to have included the step of establishing a liquid tight connection between a refuelling gun nozzle for fuel dispensing and a coupling piece of the fuel receiving object, characterized in that a level detection signalling configuration is established by moving the gun into position for establishment of the liquid-tight connection of Hansel in the method of Crandall to prevent the escape of gasoline vapors into the atmosphere as taught explicitly by Hansel.

In Reference to Claim 2

Crandall as modified by Hansel teaches the method according to claim 1 (see rejection of claim 1 above). Hansel further teaches that signals (col. 4, lines 54-58) *for detecting said predetermined level* are transferred (col. 4, lines 54-58) to the fuel

container (col. 1, lines 7-14) from means carried and supported by the gun (light conducting elements 68 and 69 are carried and supported by the gun; see Fig. 2).

In Reference to Claim 4

Crandall as modified by Hansel teaches the method according to claim 1 (see rejection of claim 1 above). Crandall further teaches that said predetermined level is detected by means of optical signals (col. 4, lines 54-58).

In Reference to Claim 14

Crandall as modified by Hansel teaches the method according to claim 1 (see rejection of claim 1 above). Hansel further teaches that completed and acceptable connection between the nozzle and the coupling piece is indicated by a mechanical indication (actuation system for the interlock valve; col. 5, line 3 - col. 6, line 13) and release arrangement of the gun by moving a release knob (pin 55) from a release position to a coupling position (col. 6, lines 7-13), release of the connection being initiated by an operator pushing said knob back to the release position (the pin 55 is pushed back to an open or release position when the operator releases pressure on the actuator arm or removing the nozzle from the fill pipe).

In Reference to Claim 19

Crandall teaches a system for spill free refuelling (abstract) comprising means for detecting a predetermined fuel level (light conducting means 39) and for automatically interrupting the fuel flow when said level is detected (col. 5, line 70 - col. 6, line 9).

Crandall does not teach the system comprising means for establishing a liquid tight connection between a refuelling gun nozzle for fuel dispensing and a coupling piece of the fuel receiving object, *through which fuel is intended to be provided to a fuel container of said object,* characterized in that a level detection signalling configuration is arranged to be established by means of moving said gun into position for establishment of the liquid tight connection.

Hansel teaches a system for spill free refueling (abstract) comprising means for establishing a liquid tight connection (vapor receiving system 25) between a refueling gun nozzle (see Fig. 1) for fuel dispensing and a coupling piece of the fuel receiving object (receiving end of the fill pipe), *through which fuel is intended to be provided to a fuel container of said object* (col. 1, lines 15-19) characterized in that a level detection signaling configuration is arranged to be established by means of moving said gun into position for establishment of the liquid tight connection (col. 3, lines 38-50 and col. 5, lines 57-65; the signally configuration is the pressure detected by the diaphragm system when the fuel reaches the end of the spout and that configuration is only established when the spout is inserted fully, causing a liquid tight connection) to prevent gasoline vapors from escaping into the atmosphere (col. 1, lines 20-32).

It would have been obvious to one having ordinary skill in the art at the time of invention to have included the means for establishing a liquid tight connection between

a refuelling gun nozzle for fuel dispensing and a coupling piece of the fuel receiving object, characterized in that a level detection signalling configuration is arranged to be established by means of moving said gun into position for establishment of the liquid tight connection (vapor recovery system and the interlock system) of Hansel in the refueling system of Crandall to prevent gasoline vapors from escaping into the atmosphere as taught explicitly by Hansel.

In Reference to Claim 20

Crandall as modified by Hansel teaches the system according to claim 19 (see rejection of claim 19 above). Crandall further teaches that means carried and supported by the gun are provided (light-conducting elements 68 and 69 are carried and supported by the gun) *for transferring signals for detecting said predetermined level to the fuel container.*

In Reference to Claim 22

Crandall as modified by Hansel teaches the system according to claim 19 (see rejection of claim 19 above). Crandall further teaches using optical signals (col. 5, lines 1-24) *for detecting said predetermined level*.

In Reference to Claim 34

Crandall as modified by Hansel teaches the method according to claim 19 (see rejection of claim 19 above). Hansel further teaches a mechanical indication and

release arrangement of the gun (actuation system for the interlock valve; col. 5, line 3 - col. 6, line 13) *for indication of complete and acceptable connection between the nozzle and the coupling piece* by moving a release knob (pin 55) from a release position to a coupling position (col. 6, lines 7-13), and release of the connection being initiated by an operator pushing said knob back to the release position (the pin 55 is pushed back to an open or release position when the operator releases pressure on the actuator arm or removing the nozzle from the fill pipe).

In Reference to Claim 35

Crandall as modified by Hansel teaches the system according to claim 34 (see rejection of claim 34 above). Hansel further teaches that the release knob is supported by a linkage arm (51) arranged to co-act with a release ring (collar 54) tiltably connected (see Fig. 1) to an outer sleeve (flexible bellows 27) of the nozzle, *said sleeve being intended to be moved towards the coupling piece in relation to the release ring and an inner nozzle part during the nozzle and coupling piece connection procedure*, *whereby the release ring is tilted and levelled out against a connection sleeve of said inner nozzle part and whereby the release ring turns the linkage arm and the knob to said coupling position and in that, during release of the nozzle from the coupling piece, the linkage arm, by an operator pressing the knob to said release position, being arranged to tilt the release ring, which due to its attachment to the outer sleeve is arranged to push the connection sleeve towards the nozzle free end and thereby releasing the coupling piece from the nozzle.*

In Reference to Claim 38

Crandall as modified by Hansel teaches the system according to claim 19 (see rejection of claim 19 above). Crandall further teaches that a fuel pipe (nozzle pip 66) is provided, *through which fuel is intended to be entered into the fuel container*, said pipe acting as a support (Fig. 2) for the reflection means (prism 73) and ending below said predetermined level (Fig. 2 shows the pipe 66 extending below the predetermined level).

12. Claims 5-8, 17, and 23-26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Crandall in view of Hansel as applied to claims 4 and 22 above, and further in view of Ellinger.

In Reference to Claim 5

Crandall as modified by Hansel teaches the method according to claim 4 (see rejection of claim 4 above). Crandall further teaches that optical signals (col. 4, lines 54-58) are transferred from an optical fibre (68) on the gun (Fig. 2) and optical signals are received by an optical fibre (69) on the gun (Fig. 2).

Crandall as modified by Hansel does not teach lens arrangements with the optical fibers on the gun.

Ellinger teaches an optical liquid level sensor which uses collimating lenses between the photo devices and the prism to improve the optical coupling (col. 4, lines 43-44).

It would have been obvious to one having ordinary skill in the art at the time of invention to have included the collimating lenses of Ellinger with the optical fibers in the system of Crandall as modified by Hansel to improve the optical coupling between the fibers and the prism as taught explicitly by Ellinger.

In Reference to Claim 6

Crandall as modified by Hansel teaches the method according to claim 4 (see rejection of claim 4 above). Crandall further teaches that optical signals are transferred to reflection means (prism 73) in the container (the prism is in the container when the nozzle is inserted into the container), the reflection means being arranged to reflect the optical signals when the fuel level has not reached the reflection means and to transmit a considerable part of the optical signals when the fuel has reached the reflection means due to a change in refractory configuration, and in, that the change in reflected signal is taken as an indication for the fuel to have reached the predetermined level (col. 4, lines 72-75 and col. 5, line 70 - col. 6, line9).

Crandall as modified by Hansel does not teach that the optical signals are in the form of visible light.

Ellinger teaches an optical liquid level sensor comprising optical signals in the form of visible and infrared light (col. 4, lines 61-64) so that the critical angle of the prism may be determined such that all of the infrared and visible light is reflected (col. 1, lines 14-30).

It would have been obvious to one having ordinary skill in the art at the time of invention to have modified the system of Crandall as modified by Hansel such that the optical signals are in the form of visible light according to the teaching of Ellinger so that the critical angle of the prism may be determined such that all of the infrared and visible light is reflected as explicitly taught by Ellinger.

In Reference to Claim 7

Crandall as modified by Hansel and Ellinger teaches the method according to claim 6 (see rejection of claim 6 above). Crandall further teaches obtaining a certain deviation between transferred optical signals and reflected optical signals by the reflection means (Fig. 13 shows the deviation between the transferred and reflected signals) *so that means for transfer and means for receiving can be positioned close together on the gun, a preferred distance (d) between said means being about 6 mm:s.*

In Reference to Claim 8

Crandall as modified by Hansel and Ellinger teaches the method according to claim 6 (see rejection of claim 6 above). Crandall further teaches that reflection of transferred optical signals is obtained by a prism arrangement (prism 73) and being designed so that approximately the same reflection properties are obtained irrespective of where along said arrangement transferred optical signals are coming in (the prisms shown if Fig. 10 and 13 have shown as having the same reflective properties irrespective of where the transferred optical signals are coming in), *whereby the gun*

may be applied and turned within a certain angle interval substantially maintaining the effective reflection properties.

Crandall does not teach a prism and lens arrangement having and arc-shaped configuration.

Ellinger teaches an optical liquid level sensor which uses collimating lenses between the photo devices and the prism to improve the optical coupling (col. 4, lines 43-44).

It would have been obvious to one having ordinary skill in the art at the time of invention to have included the collimating lenses of Ellinger with the optical fibers in the system of Crandall as modified by Hansel to improve the optical coupling between the fibers and the prism as taught explicitly by Ellinger.

Crandall as modified by Hansel and Ellinger discloses the claimed invention except for the prism and lens arrangement having an arc-shaped configuration. It would have been an obvious matter of design choice to use a prism and lens arrangement having an arc-shaped configuration, since such a modification would have involved a mere change in the shape of a component. A change in shape is generally recognized as being within the level of ordinary skill in the art. *In re Rose*, 105 USPQ 237 (CCPA 1955).

In Reference to Claim 17

Crandall as modified by Hansel and Ellinger teaches the method according to claim 6 (see rejection of claim 6 above). Crandall further teaches carrying the reflection

means (prism 73) by a fuel pipe (66), *through which fuel is entered into the fuel container* and which ends below said predetermined fuel level (Fig. 2 shows the pipe 66 extending below the predetermined level).

In Reference to Claim 23

Crandall as modified by Hansel teaches the system according to claim 22 (see rejection of claim 22 above). Crandall further teaches an optical fibre (68) arrangement on the gun (Fig. 2) *for transferring optical detection signals* (col. 4, lines 54-58) and an optical fibre (69) arrangement on the gun (Fig. 2) *for receiving optical signals* (col. 4, lines 54-58).

Crandall as modified by Hansel does not teach lenses arranged with the optical fibers on the gun.

Ellinger teaches an optical liquid level sensor which uses collimating lenses between the photo devices and the prism to improve the optical coupling (col. 4, lines 43-44).

It would have been obvious to one having ordinary skill in the art at the time of invention to have included the collimating lenses of Ellinger with the optical fibers in the system of Crandall as modified by Hansel to improve the optical coupling between the fibers and the prism as taught explicitly by Ellinger.

In Reference to Claim 24

Crandall as modified by Hansel teaches the system according to claim 22 (see rejection of claim 22 above). Crandall further teaches reflection means (prism 73) arranged in the container (the prism is arranged in the container when the nozzle is inserted into the container) *for receiving optical signals transferred to the container* (col. 4, lines 54-58), the reflection means being arranged to reflect the optical signals when the fuel level has not reached the reflection means and to transmit a considerable part of the optical signals when the fuel has reached the reflection means due to a change in refractory configuration and in that the change in reflected signal is taken as an indication for the fuel to have reached the predetermined level (col. 4, lines 72-75 and col. 5, line 70 - col. 6, line9).

Crandall as modified by Hansel does not teach that the optical signals are in the form of visible light.

Ellinger teaches an optical liquid level sensor comprising optical signals in the form of visible and infrared light (col. 4, lines 61-64) so that the critical angle of the prism may be determined such that all of the infrared and visible light is reflected (col. 1, lines 14-30).

It would have been obvious to one having ordinary skill in the art at the time of invention to have modified the system of Crandall as modified by Hansel such that the optical signals are in the form of visible light according to the teaching of Ellinger so that the critical angle of the prism may be determined such that all of the infrared and visible light is reflected as explicitly taught by Ellinger.

In Reference to Claim 25

Crandall as modified by Hansel and Ellinger teaches the system according to claim 24 (see rejection of claim 24 above). Crandall further teaches that the reflection means are arranged so that a certain deviation between transferred optical signals and reflected optical signals is provided (Fig. 13 shows the deviation between the transferred and reflected signals), *so that means for transfer and means for reception may be positioned close together on the gun, a preferred distance between said means being about 6 mm*.

In Reference to Claim 26

Crandall as modified by Hansel and Ellinger teaches the system according claim 24 (see rejection of claim 24 above). Crandall further teaches a prism arrangement (73) *for reflection of transferred optical signals* having the same or approximately the same reflection properties irrespective of where along said arrangement transferred optical signals are coming in (the prisms shown if Fig. 10 and 13 have shown as having the same reflective properties irrespective of where the transferred optical signals are coming in), *whereby the gun may be applied and turned within a certain angle interval substantially maintaining the effective reflection properties*.

Crandall does not teach a prism and lens arrangement having and arc-shaped configuration.

Ellinger teaches an optical liquid level sensor which uses collimating lenses between the photo devices and the prism to improve the optical coupling (col. 4, lines 43-44).

It would have been obvious to one having ordinary skill in the art at the time of invention to have included the collimating lenses of Ellinger with the optical fibers in the system of Crandall as modified by Hansel to improve the optical coupling between the fibers and the prism as taught explicitly by Ellinger.

Crandall as modified by Hansel and Ellinger discloses the claimed invention except for the prism and lens arrangement having an arc-shaped configuration. It would have been an obvious matter of design choice to use a prism and lens arrangement having an arc-shaped configuration, since such a modification would have involved a mere change in the shape of a component. A change in shape is generally recognized as being within the level of ordinary skill in the art. *In re Rose*, 105 USPQ 237 (CCPA 1955).

13. Claims 9, 10 and 27-29 are rejected under 35 U.S.C. 103(a) as being unpatentable over Crandall as modified by Hansel and Ellinger as applied to claims 6 and 24 above, and further in view of US Patent 6,239,875 to Verheijen (Verheijen).

In Reference to Claim 9

Crandall as modified by Hansel and Ellinger teaches the method according to claim 6 (see rejection of claim 6 above), but does not teach in that reflection is obtained by at least one cube corner prism.

Verheijen teaches an optical liquid level sensor comprising an arrangement of corner cube prisms to ease the adjustment of the light detector (col. 4, lines 49-55).

It would have been obvious to one having ordinary skill in the art at the time of invention to have replaced the prism of Crandall as modified by Hansel and Ellinger with the arrangement of corner cube prisms of Verheijen to ease the adjustment of the light detector as taught explicitly by Verheijen.

In Reference to Claim 10

Crandall as modified by Hansel, Ellinger and Verheijen teaches the method according to claim 9 (see rejection of claim 9 above). Verheijen further teaches that reflection is obtained by at least three cube corner prisms arranged in a row (Fig. 4D).

In Reference to Claim 27

Crandall as modified by Hansel and Ellinger teaches the system according to claim 24 (see rejection of claim 24 above), but does not teach at least one cube corner prism comprises by the reflection means.

Verheijen teaches an optical liquid level sensor comprising an arrangement of corner cube prisms to ease the adjustment of the light detector (col. 4, lines 49-55).

It would have been obvious to one having ordinary skill in the art at the time of invention to have replaced the prism of Crandall as modified by Hansel and Ellinger with the arrangement of corner cube prisms of Verheijen to ease the adjustment of the light detector as taught explicitly by Verheijen.

In Reference to Claim 28

Crandall as modified by Hansel, Ellinger and Verheijen teaches the system according to claim 27 (see rejection of claim 27 above). Verheijen further teaches at least three cube corner prisms arranged in a row comprised by said reflection means (Fig. 4D).

Crandall as modified by Hansel, Ellinger and Verheijen does not teach at least three corner cube prisms arranged in an arc-shaped row.

Crandall as modified by Hansel, Ellinger and Verheijen discloses the claimed invention except for at least three corner cube prisms arranged in an arc-shaped row. It would have been an obvious matter of design choice to use at least three corner cube prisms arranged in an arc-shaped row, since such a modification would have involved a mere change in the shape of a component. A change in shape is generally recognized as being within the level of ordinary skill in the art. *In re Rose*, 105 USPQ 237 (CCPA 1955).

In Reference to Claim 29

Crandall as modified by Hansel, Ellinger and Verheijen teaches the system according to claim 27 (see rejection of claim 27 above), but does not teach that each cube corner prism is provided with complementary optics in the form of a lens arrangement *for obtaining a deviation between transferred optical signals and reflected optical signals and for concentration of the reflected optical signals.*

Ellinger teaches an optical liquid level sensor which uses collimating lenses between the photo devices and the prism to improve the optical coupling (col. 4, lines 43-44).

It would have been obvious to one having ordinary skill in the art at the time of invention to have included the collimating lenses of Ellinger with the optical fibers in the system of Crandall as modified by Hansel to improve the optical coupling between the fibers and the prism as taught explicitly by Ellinger.

14. Claims 18, 39 and 40 are rejected under 35 U.S.C. 103(a) as being unpatentable over Crandall as modified by Hansel as applied to claims 1 and 19 above, and further in view of US Patent 4,934,419 to Lamont et al. (Lamont).

In Reference to Claim 18

Crandall as modified by Hansel teaches the method according to claim 1 (see rejection of claim 1 above), but does not teach two-way optical communication between an object optical communication unit and an optical control and communication unit.

Lamont teaches a fuel management system comprising two-way optical communication (col. 4, lines 36-60) between an object optical communication unit (transmitter/receiver device) and an optical control and communication unit (fuel management system 18) for enhanced security at the fueling pump (col. 4, lines 36-60).

It would have been obvious to one having ordinary skill in the art at the time of invention to have included the two-way optical communication between an object optical communication unit and an optical control and communication unit of Lamont in the

system of Crandall as modified by Hansel for enhanced security at the fueling pump as taught explicitly by Lamont.

In Reference to Claim 39

Crandall as modified by Hansel teaches the system according to claim 19 (see rejection of claim 19 above), but does not teach a two-way optical communication between an object optical communication unit of the fuel receiving object carried by the object and an optical control and communication central unit.

Lamont teaches a fuel management system comprising two-way optical communication (col. 4, lines 36-60) between an object optical communication unit (transmitter/receiver device) of the fuel receiving object carried by the object (col. 2, line 67 - col. 3, line 8) and an optical control and communication central unit (fuel management system 18) for enhanced security at the fueling pump (col. 4, lines 36-60).

It would have been obvious to one having ordinary skill in the art at the time of invention to have included the two-way optical communication between an object optical communication unit of the fuel receiving object carried by the object and an optical control and communication central unit of Lamont in the system of Crandall as modified by Hansel for enhanced security at the fueling pump as taught explicitly by Lamont.

In Reference to Claim 40

Crandall as modified by Hansel and Lamont teaches the system according to claim 39 (see rejection of claim 39 above), and further teaches that said two-way optical

communication is arranged by means of light decoding and a communication prism (Crandall, prism 73) co-acting with a dual optical communication fibre (Crandall, fibers 68 and 69; Lamont, optical fiber 20) connected to the object optical communication unit (Crandall, control panel housing 33; Lamont, fuel management system 18).

15. Claims 45, 46, 52 and 53 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ellinger in view of Verheijen.

In Reference to Claim 45

Ellinger teaches the method according to claim 41 (see rejection of claim 41 above), but does not teach reflecting said detection signal by at least one cube corner prism.

Verheijen teaches an optical liquid level sensor comprising reflecting detection signals (abstract) by an arrangement of corner cube prisms to ease the adjustment of the light detector (col. 4, lines 49-55).

It would have been obvious to one having ordinary skill in the art at the time of invention to have replaced the prism of Ellinger with the arrangement of corner cube prisms of Verheijen to ease the adjustment of the light detector as taught explicitly by Verheijen.

In Reference to Claim 46

Ellinger in view of Verheijen teaches the method according to claim 45 (see rejection of claim 45 above). Verheijen further teaches arranging at least three cube corner prisms in a row (Fig. 4D).

In Reference to Claim 52

Ellinger teaches the device according to claim 48 (see rejection of claim 48 above), but does not teach that said reflection means comprise at least one cube corner prism.

Verheijen teaches an optical liquid level sensor comprising an arrangement of corner cube prisms to ease the adjustment of the light detector (col. 4, lines 49-55).

It would have been obvious to one having ordinary skill in the art at the time of invention to have replaced the prism of Ellinger with the arrangement of corner cube prisms of Verheijen to ease the adjustment of the light detector as taught explicitly by Verheijen.

In Reference to Claim 53

Ellinger in view of Verheijen teaches the device according to claim 52 (see rejection of claim 52 above). Verheijen further teaches that said reflection means comprises at least three cube corner prisms arranged in a row (Fig. 4D).

Ellinger as modified by Verheijen discloses the claimed invention except for at least three corner cube prisms arranged in an arc-shaped row. It would have been an obvious matter of design choice to use at least three corner cube prisms arranged in an

arc-shaped row, since such a modification would have involved a mere change in the shape of a component. A change in shape is generally recognized as being within the level of ordinary skill in the art. *In re Rose*, 105 USPQ 237 (CCPA 1955).

Allowable Subject Matter

16. Claims 11, 12, 15, 30, 36, 47 and 54-56 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

17. The following is a statement of reasons for the indication of allowable subject matter: the prior art does not disclose a liquid level sensor comprising a lens arrangement, a shutter system for blocking the reflected signals with the knob in the release position, a slit through which optical signals are passed or a reflection means arranged to produce two spots, one on each side of the transfer means.

18. Claims 31, 32 and 57 would be allowable if rewritten to overcome the rejection(s) under 35 U.S.C. 112, 2nd paragraph, set forth in this Office action and to include all of the limitations of the base claim and any intervening claims.

Conclusion

19. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. US Patents 5,944,069 and 6,253,803 to Nusbaumer et al., US Patent 5,110,205 to Suzuki et al., 4, 069,838 to Hansel et al., US Patent 5,507,326 to Cadman et al., US Patent 5,249,612 to Parks et al., US Patent 4,469,149 to Walkey et al., US Patent 4,598,742 to Taylor, US Patent 4,998,022 to Tregay, US Patent 4,354,180 to Harding, US Patent 4,155,013 to Spiteri, US Patent 5,655,577 to Loen et al. and US Patent 5,399,876 to LaClair disclose systems with features similar to those claimed by Applicant.

20. Any inquiry concerning this communication or earlier communications from the examiner should be directed to NICOLAS A. ARNETT whose telephone number is (571) 270-6062. The examiner can normally be reached on Monday - Thursday 7:00 AM to 5:00 PM EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ken Bomberg can be reached on (571) 272-4922. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

NAA
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